



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL380 Gen9

(2.40 GHz, Intel Xeon E5-2699A v4)

SPECrate2017_fp_base = 147

SPECrate2017_fp_peak = 148

CPU2017 License: 3

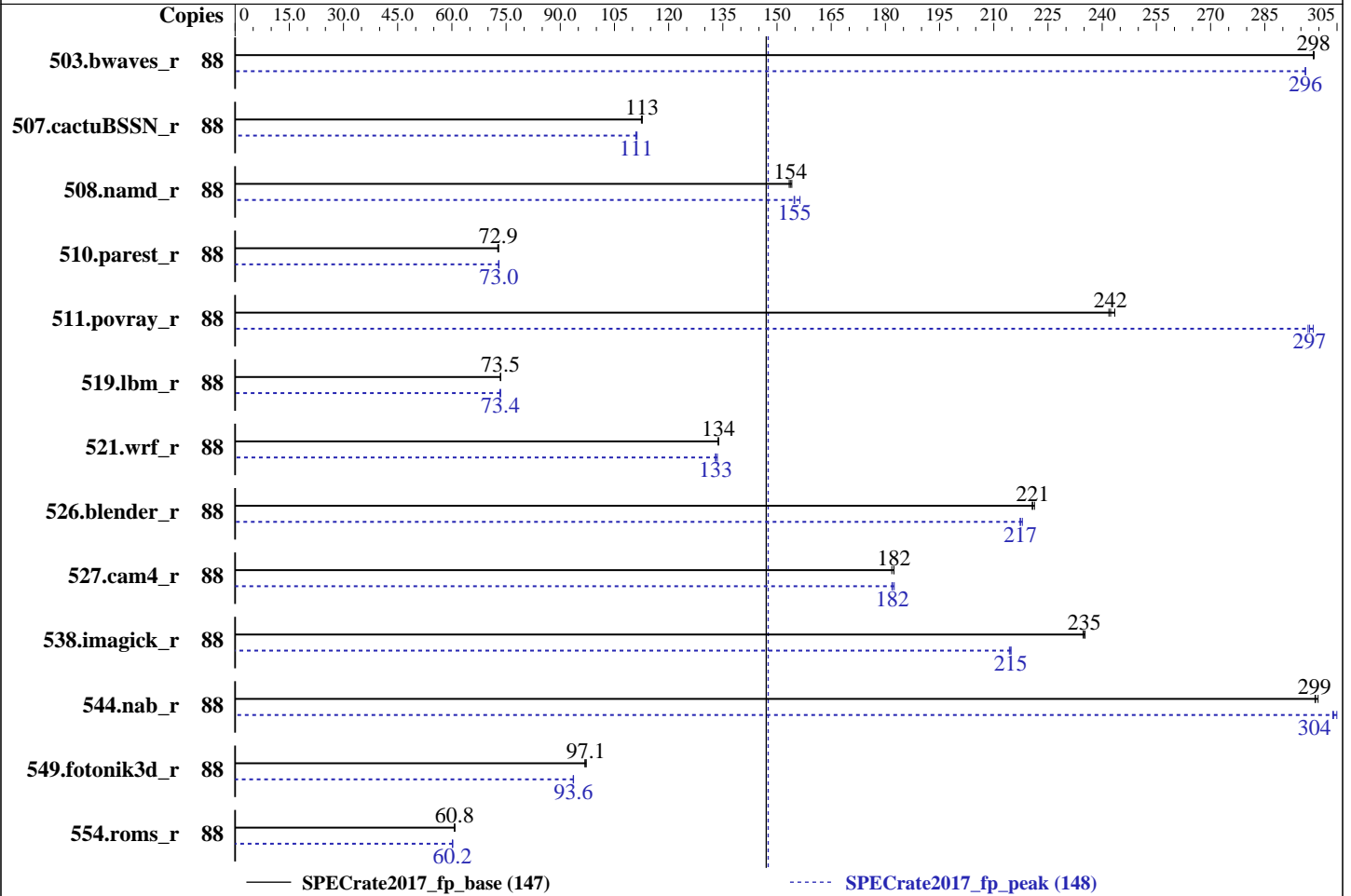
Test Sponsor: HPE

Tested by: HPE

Test Date: Dec-2016

Hardware Availability: Oct-2016

Software Availability: Sep-2016



Hardware

CPU Name: Intel Xeon E5-2699A v4
 Max MHz.: 3600
 Nominal: 2400
 Enabled: 44 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 256 KB I+D on chip per core
 L3: 55 MB I+D on chip per chip
 Other: None
 Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)
 Storage: 1 x 400 GB SAS SSD, RAID 0
 Other: None

Software

OS: SUSE Linux Enterprise Server 12 (x86_64) SP1
 Kernel 3.12.49-11-default
 Compiler: C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux;
 Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
 Parallel: No
 Firmware: P89 v2.30 9/12/16
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 32/64-bit
 Other: Microquill SmartHeap V10.2



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	88	2957	298	2955	299	2956	298	88	2979	296	2978	296	2979	296
507.cactuBSSN_r	88	989	113	989	113	991	112	88	1001	111	1004	111	1004	111
508.namd_r	88	545	153	544	154	543	154	88	540	155	535	156	540	155
510.parest_r	88	3157	72.9	3158	72.9	3166	72.7	88	3153	73.0	3158	72.9	3151	73.1
511.povray_r	88	850	242	844	243	848	242	88	691	297	689	298	692	297
519.lbm_r	88	1262	73.5	1262	73.5	1262	73.5	88	1263	73.4	1265	73.3	1263	73.4
521.wrf_r	88	1473	134	1473	134	1475	134	88	1477	133	1482	133	1482	133
526.blender_r	88	607	221	606	221	607	221	88	617	217	615	218	617	217
527.cam4_r	88	844	182	844	182	847	182	88	844	182	846	182	847	182
538.imagick_r	88	931	235	930	235	932	235	88	1019	215	1019	215	1021	214
544.nab_r	88	495	299	494	300	495	299	88	486	305	487	304	487	304
549.fotonik3d_r	88	3543	96.8	3533	97.1	3529	97.2	88	3661	93.7	3664	93.6	3663	93.6
554.roms_r	88	2301	60.8	2298	60.8	2305	60.7	88	2325	60.2	2324	60.2	2321	60.2

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The config file option 'submit' was used.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Filesystem page cache cleared with:
echo 1 > /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/sh10.2"

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2

Platform Notes

BIOS Configuration:
Power Profile set to Custom

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Platform Notes (Continued)

Power Regulator set to Static High Performance Mode
 Minimum Processor Idle Power Core C-State set to C3 State
 Minimum Processor Idle Power Package C-State set to No Package State
 Collaborative Power Control set to Disabled
 QPI Snoop Configuration set to Cluster On Die
 Thermal Configuration set to Maximum Cooling
 Processor Power and Utilization Monitoring set to Disabled
 Memory Refresh Rate set to 1x Refresh
 Energy Performance Bias set to Balanced Performance
 Sysinfo program /home/cpu2017/Docs/sysinfo
 Rev: r5007 of 2016-11-15 fc8dc82f217779bedfed4d694d580ba9
 running on dl380-gen9-2699a Sat Dec 10 00:28:29 2016

This section contains SUT (System Under Test) info as seen by some common utilities.

For more information on this section, see

<http://www.spec.org/cpu2017/Docs/config.html#sysinfo>

From /proc/cpuinfo

```

model name : Intel(R) Xeon(R) CPU E5-2699A v4 @ 2.40GHz
 2 "physical id"s (chips)
 88 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
caution.)
  cpu cores : 22
  siblings  : 44
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
 28
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
 28
cache size : 28160 KB

```

The view from numactl --hardware follows. WARNING: a numactl 'node' might or might not correspond to a physical chip.

```

available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 44 45 46 47 48 49 50 51 52 53 54
node 0 size: 128869 MB
node 0 free: 128230 MB
node 1 cpus: 11 12 13 14 15 16 17 18 19 20 21 55 56 57 58 59 60 61 62 63 64 65
node 1 size: 129277 MB
node 1 free: 128701 MB
node 2 cpus: 22 23 24 25 26 27 28 29 30 31 32 66 67 68 69 70 71 72 73 74 75 76
node 2 size: 129277 MB
node 2 free: 128714 MB
node 3 cpus: 33 34 35 36 37 38 39 40 41 42 43 77 78 79 80 81 82 83 84 85 86 87
node 3 size: 129133 MB

```

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Platform Notes (Continued)

```
node 3 free: 128592 MB
node distances:
node   0   1   2   3
  0:  10  21  31  31
  1:  21  10  31  31
  2:  31  31  10  21
  3:  31  31  21  10
```

```
From /proc/meminfo
MemTotal:          528955384 kB
HugePages_Total:      0
Hugepagesize:       2048 kB
```

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 1
# This file is deprecated and will be removed in a future service pack or
release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP1"
VERSION_ID="12.1"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"
```

```
uname -a:
Linux dl380-gen9-2699a 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Dec 10 00:25
```

```
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4        xfs   331G  137G  194G  42% /home
```

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF

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Platform Notes (Continued)

SMBIOS" standard.

BIOS HP P89 09/12/2016

Memory:

8x UNKNOWN NOT AVAILABLE

16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

(End of data from sysinfo program)

Base Compiler Invocation

C benchmarks:

`icc -m64 -std=c11`

C++ benchmarks:

`icpc -m64`

Fortran benchmarks:

`ifort -m64`

Benchmarks using both Fortran and C:

`ifort -m64 icc -m64 -std=c11`

Benchmarks using both C and C++:

`icpc -m64 icc -m64 -std=c11`

Benchmarks using Fortran, C, and C++:

`icpc -m64 icc -m64 -std=c11 ifort -m64`

Base Portability Flags

503.bwaves_r: -DSPEC_LP64

507.cactuBSSN_r: -DSPEC_LP64

508.namd_r: -DSPEC_LP64

510.parest_r: -DSPEC_LP64

511.povray_r: -DSPEC_LP64

519.lbm_r: -DSPEC_LP64

521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian

526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG

538.imagick_r: -DSPEC_LP64

544.nab_r: -DSPEC_LP64

549.fotonik3d_r: -DSPEC_LP64

554.roms_r: -DSPEC_LP64



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Base Optimization Flags

C benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32 -qopt-prefetch  
-qopt-mem-layout-trans=3
```

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32  
-qopt-prefetch -qopt-mem-layout-trans=3 -L/sh10.2 -lsmartheap64
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32 -qopt-prefetch  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
```

Benchmarks using both C and C++:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32  
-qopt-prefetch -qopt-mem-layout-trans=3 -L/sh10.2 -lsmartheap64
```

Benchmarks using Fortran, C, and C++:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32  
-qopt-prefetch -qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-L/sh10.2 -lsmartheap64
```

Peak Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

C++ benchmarks:

```
icpc -m64
```

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:

```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```
icpc -m64 icc -m64 -std=c11 ifort -m64
```



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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```
-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -ipo -O3
-no-prec-div -auto-p32 -qopt-prefetch -qopt-mem-layout-trans=3
```

C++ benchmarks:

```
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -ipo
-O3 -no-prec-div -auto-p32 -qopt-prefetch -qopt-mem-layout-trans=3
-L/sh10.2 -lsmartheap64
```

Fortran benchmarks:

```
-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -ipo -O3
-no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3
-nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -ipo -O3
-no-prec-div -auto-p32 -qopt-prefetch -qopt-mem-layout-trans=3
-nostandard-realloc-lhs
```

Benchmarks using both C and C++:

```
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -ipo
-O3 -no-prec-div -auto-p32 -qopt-prefetch -qopt-mem-layout-trans=3
-L/sh10.2 -lsmartheap64
```

Benchmarks using Fortran, C, and C++:

```
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2 -ipo
-O3 -no-prec-div -auto-p32 -qopt-prefetch -qopt-mem-layout-trans=3
-nostandard-realloc-lhs -L/sh10.2 -lsmartheap64
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic17.0-official-linux64-revD.html>

<http://www.spec.org/cpu2017/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic17.0-official-linux64-revD.xml>

<http://www.spec.org/cpu2017/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml>



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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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